EXHIBIT 18 (Part 1)

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Practitioner's Docket No. 201141.00292 ***PATENT***

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: David L. CHASE

Application No.: 11/549,286

Filed: October 13, 2006

Group Art Unit: 1742

For: ANNEALING OF HOT ROLLED STEEL COILS WITH CLAM SHELL FURNACE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
ATTENTION: Special Program Examiners

REQUEST FOR RECONSIDERATION OF DECISION ON PETITION TO MAKE SPECIAL

In response to a Decision on Petition to Make Special in the above referenced application mailed November 6, 2006, Applicant hereby requests reconsideration of a decision to dismiss the petition.

In the Decision on Petition to Make Special mailed November 6, 2006, Special Programs Examiner Tierney dismissed the Petition to Make Special filed on October 13, 2006 for the reason of a deficient support document.

Filed with this Request for Reconsideration is an amended support document entitled "Accelerated Examination Support Document under USPTO MPEP § 708.02(a) Accompanying Request for Reconsideration of Petition to Make Special." Additionally, a copy of the translation of JP 61-060829 previously filed is submitted with an addition of page and line numbers for your convenience.

No fees are believed to be due. However, in the event that a fee for this filing is insufficient, the Commissioner is authorized to charge any fee deficiency or to credit any overpayment to Deposit Account 15-0450.

Applicant respectfully asserts that Applicant has fulfilled the required conditions to be accorded special status under the accelerated examination procedure. Applicant respectfully requests that the Petition to Make Special filed October 13, 2006, and supplemented herein, be granted.

Respectfully submitted,

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In re application of: David L. CHASE

Application No.: 11/549,286

Filed: October 13, 2006

Group Art Unit: 1742

For: ANNEALING OF HOT ROLLED STEEL COILS WITH CLAM SHELL FURNACE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
ATTENTION: Special Program Examiners

ACCELERATED EXAMINATION SUPPORT DOCUMENT UNDER USPTO MPEP § 708.02(a) ACCOMPANYING REQUEST FOR RECONSIDERATION OF PETITION TO MAKE SPECIAL

This Accelerated Examination Support Document under USPTO MPEP § 708.02(a) is being filed with a Request for Reconsideration of Petition to Make Special for the above referenced application entitled "Annealing of Hot Rolled Steel Coils with Clam Shell Furnace." According to the Decision on Petition to Make Special dated November 6, 2006, the conditions regarding the application (section I, subsections 1-4) are considered to have been met. Additionally, the conditions regarding the petition (section II, subsections 1-5) are considered to have been met.

This Accelerated Examination Support Document under USPTO MPEP § 708.02(a) Accompanying Request for Reconsideration addresses the deficiencies indicated in the Decision on Petition to Make Special dated November 6, 2006.

6.1 References Deemed Most Closely Related:

An Information Disclosure Statement in compliance with 37 CFR 1.98 was filed with the previously filed petition citing the references deemed most closely related to the subject matter of the claims.

6.2 Identification of Limitations Disclosed by References:

See the Appendix beginning on page 11 for a detailed showing.

6.3 Detailed Explanation of Patentability:

The furnace comprises a furnace housing that pivots between an open position and a closed position in a clam shell configuration. Coils to be annealed are positioned in the furnace of the present invention with their coil axes in a substantially horizontal position. The furnace further comprises a sealing device that seals the furnace housing to a base portion when the housing is in the closed position, a system capable of establishing a reducing atmosphere, and heating elements for heating the coils during the annealing process.

There is no disclosure or suggestion in the prior art of a furnace housing that pivots between an open and closed position in combination with coils placed in a horizontal position for annealing. As discussed below, coils have been heat treated or annealed in a substantially horizontal position; however, there is no motivation or teaching of combining the substantially horizontal coils with a furnace housing that pivots between an open and closed position.

Further, while there is at least one prior patent of an annealing apparatus, U.S. Patent 6,346,214, that discloses a tiltable furnace, there is no teaching or motivation for a furnace housing that pivots between an open and closed position in combination with coils placed in a horizontal position for annealing.

U.S. Patent 6,346,214 to Knudsen et al. teaches a tiltable top hat furnace for annealing metal coils, providing an apparatus that simplifies the loading and unloading of metal coils. The apparatus has an arbor or arbors for holding a coil of metal in a vertical position for annealing, as well as an annealing hood and a heating hood. Col. 3, ll. 46-56. The annealing hood is sealed over the coils, and then the hood assembly with the coils is positioned into a vertical position for annealing. Col. 3, ll. 54-56. The heating hood has an opening on a side, through which the annealing hood can pass through, and doors or other means for opening and closing the opening. Col. 3, ll. 64-67. The heating hood is movable relative to the annealing hood so that the heating hood moves laterally over the annealing hood, the annealing hood passing through the opening in the side of the heating hood. Col. 2, ll. 31-36, 46-51.

U.S. Patent 6,346,214 to Knudsen does not anticipate the present invention because the '214 patent's coils are positioned on standard arbors in a vertical position during annealing. Further, the heating hood of the present patent application is not translated laterally as specified by the '214 patent. Nor does the '214 patent teach or suggest annealing coils positioned with their coil axes horizontal as provided in the present patent application. The '214 patent teaches away by providing an elaborate apparatus to position the coils in a vertical position for annealing. *See* col. 3, ll. 9-14. Patent 6,346,214 does not disclose or suggest an annealing furnace comprising a housing comprising a pivot member with a lateral axis, where the housing pivotably rotates about a pivot member between an opened and a closed position, and a retaining element within the furnace housing where the retaining element holds each coil such that the axis of each coil is generally horizontal to the base portion as provided in the presently claimed subject matter.

JP 61-060829 to Mitsubishi Heavy Industries Ltd. teaches a method for annealing coils using heat retained in the hot-rolled coils themselves without an annealing furnace. An English translation is attached hereto. The method involves placing coils of hot rolled steel in series on a coil skid while the rolls are still hot. An insulated cover is placed over the coils to prevent the temperature of the coils from decreasing rapidly so the coils are annealed by retaining heat from the coils. (Translation, section "Means of Solving the Problems").

JP 61-060829 does not disclose or suggest the presently claimed invention. To the contrary, the JP '829 patent teaches away from using the present coil annealing furnace, as the stated purpose of the JP '829 patent is to make a coil annealing furnace unnecessary. *See* translation, section "Effects of the Invention". JP '829 does not disclose or suggest an annealing furnace comprising a housing comprising a pivot member with a lateral axis, where the housing pivotably rotates about a pivot member between an opened and a closed position, and a plurality of heating elements located within the furnace housing capable of heating hot rolled steel coil during the annealing process as provided in the presently claimed subject matter.

U.S. Patent 4,504,957 to McClelland et al. teaches a high temperature annealing furnace having a removable bell (col. 4, ll. 37-43, col. 5, ll. 58-60) over a base, which supports the coils for annealing in a conventional vertical position. Col. 1, ll. 61-67. The removable bell includes heating elements in the bell, and insulation on the sides and roof of the bell. Col. 6, ll. 39-62.

U.S. Patent 4,504,957 does not disclose or teach the presently claimed invention. To the contrary, the '957 patent teaches that orienting the coils with horizontal coil axes is unsuccessful for annealing, and that vertical positioning of the coils is required for successful annealing. *See* col. 1, ll. 61-67. Patent 4,504,957 does not disclose or suggest an annealing furnace comprising a housing comprising a pivot member with a lateral axis, where the housing pivotably rotates about a pivot member between an opened and a closed position, and a retaining element within the furnace housing where the retaining element holds each coil such that the axis of each coil is generally horizontal to the base portion as provided in the presently claimed subject matter.

U.S. Patent 4,817,920 to Erfort, Jr. teaches an annealing furnace arranged in an annular shape. Col. 3, l. 11. The furnace comprises a stationary housing and a rotating annular hearth. Col. 4, l. 4. The rotating hearth comprises coil supports for positioning coils of steel horizontally with their coil axes in a radial direction. FIG. 1. The furnace comprises a plurality of heating stations, where hot gases are blown against the ends of the coils. Col. 4, ll. 31-46. The rotating hearth indexes the coils from one heating station to another as the hearth rotates inside the housing. Col. 4, ll. 46-49.

U.S. Patent 4,817,920 to Erfort, Jr. does not disclose or teach the presently claimed invention. To the contrary, patent 4,817,920 teaches away by providing a plurality of stations in a furnace housing, where each station treats one coil at a time. *See* col. 4, l. 20. Patent 4,817,920 does not disclose or suggest an annealing furnace comprising both a housing comprising a pivot member with a lateral axis, where the housing pivotably rotates about a pivot member between an opened and a closed position, and a retaining element within the furnace housing where the retaining element holds each coil such that the axis of each coil is generally horizontal to the base portion as provided in the presently claimed subject matter.

U.S. Patent 4,147,506 to Southern et al. provides an insulated cover for use in an annealing furnace. Col. 2, ll. 24-25. The insulated cover is placed between the heating elements and a vertical coil to shield the coil from excessive heat that could damage the outer wrap of the coil. Col. 1, ll. 29-33.

U.S. Patent 4,147,506 to Southern et al. does not disclose or teach the presently claimed invention. The coils in patent 4,147,506 are annealed in a vertical position through a bell furnace. Col. 1, ll. 10-14. Patent 4,147,506 does not disclose or suggest an annealing furnace comprising a housing comprising a pivot member with a lateral axis, where the housing pivotably rotates about a pivot member between an opened and a closed position, and a retaining element within the furnace housing where the retaining element holds each coil such that the axis of each coil is generally horizontal to the base portion as provided in the presently claimed subject matter.

U.S. Patent 2,613,070 to Verwohlt teaches a method of annealing a single coil of steel, wherein the steel is wound onto a mandrel, col. 4, ll. 36-40, and the coil is rotated in an annealing furnace during annealing. Col. 4, ll. 57-58. The coil may be covered by a protective steel cover (col. 4, ll. 36-40), and the atmosphere in the furnace may be modified by injecting a protective gas. Col. 4, ll. 45-48. The coil may begin to open up as it rotates allowing heat and gas to enter the convolutions of the coil. Col. 5, ll. 18-23.

U.S. Patent 2,613,070 does not disclose or teach the presently claimed invention. The coils are not maintained stationary in horizontal position during annealing. To the contrary, the '070 teaches away from the present invention by teaching that the coils are rotated during annealing. *See* col. 5, ll. 18-28. Patent 2,613,070 does not disclose or suggest an annealing furnace comprising both a housing comprising a pivot member with a lateral axis, where the housing pivotably rotates about a pivot member between an opened and a closed position, and a retaining element within the furnace housing where the retaining element holds each coil such that the axis of each coil is generally horizontal to the base portion as provided in the presently claimed subject matter.

U.S. Patent 6,358,337 to Esteban Sanz et al. does not disclose or suggest the presently claimed invention. U.S. Patent 6,358,337 teaches a process for annealing a coil of drawn carbon steel, providing a method that reduces a loss of carbon from the steel caused by reaction with water. The process includes a step of holding the heat treatment at a temperature below the temperature where carbon and water in a vapor phase react, thereby avoiding a reaction between carbon in the steel and water vapor, and maintaining that temperature until the core of the coil is the same temperature as the outer part of the roll. This intermediate temperature is maintained reducing the water vapor from the core of the coil. Then the coil is further heated to an annealing temperature.

U.S. Patent 5,788,483 to Drigani et al. does not disclose or suggest the presently claimed invention. U.S. Patent 5,788,483 teaches a furnace for maintaining coil temperature, containing a coil transfer system providing a system for moving horizontal coils from one end of the furnace to the other, and queuing the coils at the output of the furnace. The furnace contains a coil transfer system comprising a plurality of positioning stations and a means for lifting and moving coils. The positioning stations have a raised position and a lowered position, such that when the positioning stations are in the lowered position, the lifting and moving means cooperate with the coils to advance the coils to the next station, and when the positioning stations are in the raised position, the coils remain in the present positioning station.

U.S. Patent 4,527,409 to Ouwerkerk does not disclose or suggest the presently claimed invention. U.S. Patent 4,527,409 teaches a process for hot rolling steel using heat reflecting screens, providing a process that reduces the heat loss from the hot steel while the steel moves between processes. Heat reflecting screens are placed over the hot steel for reflecting heat back onto the steel. The heat reflecting screen swings or pivots upwardly away from the steel. The heat reflecting screens are cooled so that the temperature of the reflecting surface is above the dew point of the atmosphere.

U.S. Patent 4,463,585 to Laws et al. does not disclose or suggest the presently claimed invention. U.S. Patent 4,463,585 teaches a heat shield arrangement for hot sheet material, providing an insulated reflecting surface for reducing the heat loss from the hot sheet material. The heat shields are arranged over and under the travel path of the sheet. The heat shields comprise a ceramic fiber insulation covered by a heat reflecting material such as stainless steel. Heating elements may be incorporated in the heat shields to maintain sheet temperature. The upper heat shield is adapted to pivot up out of the way if the traveling sheet material leaves its intended path.

U.S. Patent 3,855,019 to Salsgiver et al. does not disclose or suggest the presently claimed invention. U.S. Patent 3,855,019 teaches an improved process for producing electromagnetic silicon steel, the improvement including a step of annealing the hot rolled coil at a temperature between 1400 °F and 1700 °F.

U.S. Patent 3,636,579 to Sakakura et al. does not disclose or suggest the presently claimed invention. U.S. Patent 3,636,579 teaches an improved process for producing electromagnetic steel sheet, the improvement including a step of annealing the steel at a temperature between 750 °C and 1200 °C before a cold rolling process.

U.S. Patent 2,113,537 to Hiemens does not disclose or suggest the presently claimed invention. U.S. Patent 2,113,537 teaches a process for producing steel, including steps of annealing the steel at a temperature at 1000 °C before a cold rolling process and annealing the steel at a temperature at 1250 °C after cold rolling.

EP 0,468,716 to Allegheny Ludlum Corporation does not disclose or suggest the presently claimed invention. EP 0,468,716 teaches a heat shield arrangement for transferring a hot metal material to a finishing mill, providing an insulated heat shield for reducing the heat loss from the hot metal bar before the metal enters the finishing mill. The heat shields are arranged over and under the travel path of the sheet. The heat shields comprise modules of ceramic fiber blankets.

6.4 Concise Statement of Utility:

The present invention has utility as an annealing furnace for annealing coils of hot rolled steel.

6.5 Showing of Support under 35 USC 112:

See the Appendix beginning on page 11 for a detailed showing. The claims were part of the application as filed, and therefore are *per se* fully supported by the specification. In general, the claims find support under the first paragraph of 35 U.S.C. § 112 in the written description of the specification as filed in the paragraphs [0010] through [0025] and [0032] to [0035].

The claims do not invoke 35 USC 112, sixth paragraph.

6.6 Identification of References Disqualified as Prior Art under 35 USC 103(c):

None of the cited references are disqualified as prior art under 35 USC 103(c).

Respectfully submitted,

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APPENDIX

	ELEMENTS:	THIS APPLICATION 11/549,286	6,346,214	JP 61-060829 page and line numbers reference to translation
1Pre	A method of annealing hot rolled steel coil	[0010] Claim 1	col. 3 ll. 63-67	pg. 1 ln. 26
1a1	assembling a furnace housing comprising a plurality of side walls, a base portion and a roof portion	[0010] [0022] Claim 1 Figs. 1-2	col. 3 ll. 63-66 col. 2 ll. 46-51 Fig. 2	pg. 2 ln. 4 pg. 3 ll.28-30 Fig. 2
1a2	where the housing pivotably rotates about a pivot member	[0010] [0022] Fig. 3	col. 2 ll. 27-28 col. 3 ll. 50-51	Not taught
1a3	between an opened and closed position	[0010] [0022] Fig. 3	Not taught (different from col. 2 ll. 9-11; col. 2 ll. 63-67)	Not taught
1a4	wherein the pivot member has a lateral axis	[0010] [0022]	col. 2 ll. 36-39	Not taught
1b	positioning hot rolled coils of steel in the furnace such that the axis of the coil is generally horizontal to the base portion	[0010] [0023]	col. 2 ll. 54-57	pg. 1 ll. 30-31 pg. 5 ll. 4-5
1c	pivoting housing about the hot rolled coils to close the furnace	[0010] [0022]	Not taught	Not taught
1d	establishing a reducing atmosphere with the furnace	[0010] [0029]	col. 1 ll. 30-32 col. 3 ll. 43-44	Not taught
1e	annealing the hot rolled coils of steel in the furnace	[0010] [0027]	col. 3 ln. 67	pg. 2 ll. 1-2 pg. 6 ll. 23-24
1f	pivoting housing about the hot rolled coils to open the furnace	[0010] [0022]	Not taught	Not taught
2	coil placed on its circumferential surface	[0023]	Not taught	pg. 6 ll. 3-10 Fig. 2
3	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught
4	reducing atmosphere comprises nitrogen	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught

	ELEMENTS:	THIS APPLICATION 11/549,286	6,346,214	JP 61-060829 page and line numbers reference to translation
5	reducing atmosphere comprises propylene	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught
6	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught
7a	annealing cycle time less than 75 hours	[0027]	Not taught (different from col. 2 ln. 20)	Not taught (different from pg. 7 ll. 17-27)
7b	annealing temperature between 1200 - 1650 degree F	[0027]	Not taught	pg. 7 ln. 8
8Pre	A furnace for annealing hot rolled steel coil	[0013] Claim 8	col. 1 ll. 7-8	Not taught (different from pg. 2 ll. 1-2; pg. 9 ll. 17-18
8a1	a furnace housing comprising a plurality of side walls, a base portion, a roof portion and	[0013] [0022] Claim 8 Figs. 1-2	col. 2 ll. 46-51 col. 3 ll. 63-66 FIG. 2	pg. 2 ln. 4 pg. 3 ll. 28-30 Fig. 2
8a2	a pivot member with an axis generally parallel with the base portion	[0013] [0022]	col. 2 ll. 36-38	Not taught
8a3	where the housing pivotably rotates about the pivot member	[0013] [0022] Fig. 3	col. 2 ll. 27-28 col. 3 ll. 50-51	Not taught
8a4	between an opened and a closed position	[0013] [0022] Fig. 3	Not taught (different from col. 2 ll. 9-11; col. 2 ll. 63-67)	Not taught

	ELEMENTS:	THIS APPLICATION 11/549,286	6,346,214	JP 61-060829 page and line numbers reference to translation
8b1	a retaining element within the furnace housing where the retaining element holds each coil	[0013] [0023]	col. 2 ll. 23-24 col. 3 ll. 47-49	pg. 6 ll. 3-13
8b2	such that the axis of each coil is generally horizontal to the base portion	[0013] [0023]	Not taught (different from col. 2 ll. 23-24)	pg.1 ll. 30-31 pg. 5 ll. 4-5
8c	a sealing device capable of sealing the furnace housing when in the closed position	[0013] [0029]	col. 1 ln. 29 col. 3 ll. 55-56	Not taught
8d	a system capable of establishing a reducing atmosphere within the furnace when sealed	[0013] [0029]	col. 1 ll. 30-32 col. 3 ll. 43-44	Not taught
8e	a plurality of heating elements located within the furnace housing capable of heating hot rolled steel coil during the annealing process	[0013] [0024]	Not taught (different from col. 3 ll. 63-64)	Not taught
9	coil placed on its circumferential surface	[0023]	Not taught	pg. 6 ll. 3-10 Fig. 2
10a	annealing cycle time less than 75 hours	[0027]	Not taught (different from col. 2 ln. 20)	Not taught (different from pg. 7 ll. 17-27)
10b	annealing temperature between 1200 - 1650 degree F	[0027]	Not taught	pg. 7 ln. 8

	ELEMENTS:	THIS APPLICATION 11/549,286	6,346,214	JP 61-060829 page and line numbers reference to translation
11	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught
12	reducing atmosphere comprises nitrogen	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught
13	reducing atmosphere comprises propylene	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught
14	reducing atmosphere comprises hydrogen	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught
15	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	[0030]	Not taught (different from col. 1 ll. 30-32; col. 3 ll. 43-44)	Not taught
16a	annealing cycle time range 40 - 60 hours	[0027]	Not taught (different from col. 2 ln. 20)	Not taught (different from pg. 7 ll. 17-27)
16b	annealing temperature between 1200 - 1600 degree F	[0027]	Not taught	pg. 7 ln. 8
17	annealing is a batch process	[0021]	col. 3 ln.63-col. 4 ln.3	pg. 3 ll. 21-28

	ELEMENTS:	4,504,957	4,817,920	4,147,506
1Pre	A method of annealing hot rolled steel coil	col. 4 ll. 1-4	col.1 ll. 12-13	col. 1 ll. 4-5
1a1	assembling a furnace housing comprising a plurality of side walls, a base portion and a roof portion	col. 5 ll. 58-60 col. 3 ll. 5-6, 9 col. 6 ll. 15-17	col. 2 ll. 66-68	col. 2 ll. 10-13 Figs. 1-3
1a2	where the housing pivotably rotates about a pivot member	Not taught	Not taught	Not taught
1a3	between an opened and closed position	Not taught	Not taught	Not taught
1a4	wherein the pivot member has a lateral axis	Not taught	Not taught	Not taught
1b	positioning hot rolled coils of steel in the furnace such that the axis of the coil is generally horizontal to the base portion	Not taught (different from col. 1 ll. 59-66)	col. 3 ll. 11-22 col. 2 ln. 26	Not taught
1c	pivoting housing about the hot rolled coils to close the furnace	Not taught	Not taught	Not taught
1d	establishing a reducing atmosphere with the furnace	col. 3 ll. 24-28	col. 1 ll. 27-28 col. 4 ll. 26-30	col. 1 ln. 16 col. 3 ll. 13-14
1e	annealing the hot rolled coils of steel in the furnace	col. 4 ll. 1-4	col. 1 ll. 52-53 col. 5 ll. 5-7	col. 1 ll. 5-7
1f	pivoting housing about the hot rolled coils to open the furnace	Not taught	Not taught	Not taught
2	coil placed on its circumferential surface	Not taught	col. 3 ll. 11-14	Not taught
3	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	col. 3 ll. 24-28	col. 1 ll. 27-28	col. 3 ll. 13-14
4	reducing atmosphere comprises nitrogen	col. 3 ln. 28	col. 1 ll. 27-28	col. 3 ll. 13-14

	ELEMENTS:	4,504,957	4,817,920	4,147,506
5	reducing atmosphere comprises propylene	col. 3 ll. 24-28	col. 1 ll. 27-28	col. 3 ll. 13-14
6	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	col. 3 ll. 24-28	col. 1 ll. 27-28	col. 3 ll. 13-14
7a	annealing cycle time less than 75 hours	col. 3 ln. 67-col. 4 ln.8	Not taught	Not taught
7b	annealing temperature between 1200 - 1650 degree F	col. 4 ln. 3	Not taught	Not taught
8Pre	A furnace for annealing hot rolled steel coil	col. 1 ll. 6-7	col. 2 ll. 64-65	col. 2 ll. 8-10
8a1	a furnace housing comprising a plurality of side walls, a base portion, a roof portion and	col. 3 ll. 5-6, 9 col. 5 ll. 58-60 col. 6 ll. 15-17	col. 2 ll. 66-68	col. 2 ll. 10-13
8a2	a pivot member with an axis generally parallel with the base portion	Not taught	Not taught	Not taught
8a3	where the housing pivotably rotates about the pivot member	Not taught	Not taught	Not taught
8a4	between an opened and a closed position	Not taught	Not taught	Not taught

	ELEMENTS:	4,504,957	4,817,920	4,147,506
8b1	a retaining element within the furnace housing where the retaining element holds each coil	col. 4 ll. 37-53 col. 2 ll. 57-58	col. 3 ll. 11-22 col. 4 ll. 19-20	col. 2 ll. 12-13 col. 2 ll. 18-22 col. 2 ln. 68 col. 3 ll. 1-5
8b2	such that the axis of each coil is generally horizontal to the base portion	Not taught (different from col. 1 ll. 59-66)	col. 3 ll. 13-14 col. 2 ln. 26	Not taught
8c	a sealing device capable of sealing the furnace housing when in the closed position	col. 3 ll. 6-8 col. 5 ll. 42-44	col. 3 ll. 64-67	col. 3 ll. 5-12
8d	a system capable of establishing a reducing atmosphere within the furnace when sealed	col. 3 ll. 24-28	col. 1 ll. 27-28 col. 4 ll. 26-30	col. 1 ln. 16 col. 3 ll. 13-14
8e	a plurality of heating elements located within the furnace housing capable of heating hot rolled steel coil during the annealing process	col. 3 ll. 10-11 col. 6 ll. 58-68 col. 7 ll. 1-37 col. 5 ll. 5-7	Not taught	col. 1 ll. 18-20 col. 2 ll. 13-15 col. 2 ll. 62-64
9	coil placed on its circumferential surface	Not taught	col. 3 ll. 11-14	Not taught
10a	annealing cycle time less than 75 hours	col. 3 ln. 67-col. 4 ln.8	Not taught	Not taught
10b	annealing temperature between 1200 - 1650 degree F	col. 4 ln. 3	Not taught	Not taught

	ELEMENTS:	4,504,957	4,817,920	4,147,506
11	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	col. 3 ll. 24-28	col. 1 ll. 27-28	col. 3 ll. 13-14
12	reducing atmosphere comprises nitrogen	col. 3 ln. 28	col. 1 ll. 27-28	col. 3 ll. 13-14
13	reducing atmosphere comprises propylene	col. 3 ll. 24-28	col. 1 ll. 27-28	col. 3 ll. 13-14
14	reducing atmosphere comprises hydrogen	col. 3 ll. 24-28 col. 8 ln. 19	col. 1 ll. 27-28	col. 3 ll. 13-14
15	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	col. 3 ll. 24-28	col. 1 ll. 27-28	col. 3 ll. 13-14
16a	annealing cycle time range 40 - 60 hours	col. 3 ln.67-col. 4 ln.8	Not taught	Not taught
16b	annealing temperature between 1200 - 1600 degree F	col. 4 ln. 3	Not taught	Not taught
17	annealing is a batch process	col. 3 ln. 67-col. 4 ln.8	Not taught (different from col. 2 ll. 37-38)	col. 2 ll. 58-60 Fig. 3

	ELEMENTS:	2,613,070	6,358,337	5,788,483
1Pre	A method of annealing hot rolled steel coil	col. 1 ll. 27-29	col. 1 ll. 10-12	Not taught
1a1	assembling a furnace housing comprising a plurality of side walls, a base portion and a roof portion	col. 3 ll. 49-53	col. 3 ll. 62-64	col. 2 ll. 62-67 col. 4 ll. 24-28
1a2	where the housing pivotably rotates about a pivot member	Not taught	Not taught	Not taught
1a3	between an opened and closed position	Not taught	Not taught	Not taught
1a4	wherein the pivot member has a lateral axis	Not taught	Not taught	Not taught
1b	positioning hot rolled coils of steel in the furnace such that the axis of the coil is generally horizontal to the base portion	col. 1 ll. 29-31 col. 1 ll. 35-37	Not taught	col. 4 ll. 37-38 Figs. 1-5
1c	pivoting housing about the hot rolled coils to close the furnace	Not taught	Not taught	Not taught
1d	establishing a reducing atmosphere with the furnace	col. 1 ll. 22-26 col. 2 ll. 4-9 col. 2 ll. 21-35 col. 4 ll. 45-46	col. 2 ll.1-4 col. 5 ll.12-17 col. 6 ll. 36-38	Not taught
1e	annealing the hot rolled coils of steel in the furnace	col. 5 ll. 12-13 col. 1 ll. 27-29	col. 3 ll.1-3, 62-67 col. 4 ln. 66-col.5 ln. 6	Not taught
1f	pivoting housing about the hot rolled coils to open the furnace	Not taught	Not taught	Not taught
2	coil placed on its circumferential surface	Not taught (different from col. 2 ll. 41-42)	Not taught	Figs. 1-3
3	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	Not taught	col. 2 ll. 1-4	Not taught
4	reducing atmosphere comprises nitrogen	Not taught	col. 2 ll. 1-4	Not taught

	ELEMENTS:	2,613,070	6,358,337	5,788,483
5	reducing atmosphere comprises propylene	Not taught	col. 2 ll. 1-4	Not taught
6	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	Not taught	col. 2 ll. 1-4	Not taught
7a	annealing cycle time less than 75 hours	Not taught	Figs. 1B, 2B	Not taught
7b	annealing temperature between 1200 - 1650 degree F	Not taught	col. 4 ll. 48-57 col. 1 ll. 44-48 col. 3 ll. 17-20 Figs. 1B, 2B	Not taught
8Pre	A furnace for annealing hot rolled steel coil	col. 1 ll. 27-29	Not taught	Not taught
8a1	a furnace housing comprising a plurality of side walls, a base portion, a roof portion and	col. 3 ll. 49-53	col. 3 ll. 62-64	col. 2 ll. 62-67 col. 4 ll. 24-28
8a2	a pivot member with an axis generally parallel with the base portion	Not taught	Not taught	Not taught
8a3	where the housing pivotably rotates about the pivot member	Not taught	Not taught	Not taught
8a4	between an opened and a closed position	Not taught	Not taught	Not taught

	ELEMENTS:	2,613,070	6,358,337	5,788,483
8b1	a retaining element within the furnace housing where the retaining element holds each coil	col. 1 ll. 46-52 col. 3 ln.75- col. 4 ln.9	Not taught	col. 3 ll. 1-7 col. 4 ll. 30-41
8b2	such that the axis of each coil is generally horizontal to the base portion	col. 1 ll. 29-31 col. 1 ll. 35-37 Figs. 1-2	Not taught	col. 4 ll. 37-38 Figs. 1-5
8c	a sealing device capable of sealing the furnace housing when in the closed position	col. 3 ll. 2-4 col. 3 ll. 62-65	Not taught	Not taught
8d	a system capable of establishing a reducing atmosphere within the furnace when sealed	col. 1 ll. 22-26 col. 2 ll. 4-9 col. 2 ll. 21-35	col. 5 ll. 12-17 col. 6 ll. 36-38	Not taught
8e	a plurality of heating elements located within the furnace housing capable of heating hot rolled steel coil during the annealing process	col. 3 ll. 68-71 col. 5 9-12	Not taught	col. 2 ln. 64
9	coil placed on its circumferential surface	Not taught (different from col. 2 ll. 41-42)	Not taught	Figs. 1-3
10a	annealing cycle time less than 75 hours	Not taught	Figs. 1B, 2B	Not taught
10b	annealing temperature between 1200 - 1650 degree F	Not taught	col. 1 ll. 44-46 col. 3 ll. 17-20 col. 4 ll. 48-57 Figs. 1B, 2B	Not taught

	ELEMENTS:	2,613,070	6,358,337	5,788,483
11	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	Not taught	col. 2 ll. 1-4	Not taught
12	reducing atmosphere comprises nitrogen	Not taught	col. 2 ll. 1-4	Not taught
13	reducing atmosphere comprises propylene	Not taught	col. 2 ll. 1-4	Not taught
14	reducing atmosphere comprises hydrogen	Not taught	col. 2 ll. 1-4	Not taught
15	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	Not taught	col. 2 ll. 1-4	Not taught
16a	annealing cycle time range 40 - 60 hours	Not taught	Figs. 1B, 2B	Not taught
16b	annealing temperature between 1200 - 1600 degree F	Not taught	col. 4 ll. 48-57 col. 1 ll. 44-48 col. 3 ll. 17-20 Figs. 1B, 2B	Not taught
17	annealing is a batch process	Figs. 1-2	col. 3 ll. 62-67	Not taught

	ELEMENTS:	4,527,409	4,463,585	3,855,019
1Pre	A method of annealing hot rolled steel coil	Not taught	Not taught	col. 1 ll. 51-53
1a1	assembling a furnace housing comprising a plurality of side walls, a base portion and a roof portion	Not taught	Not taught	Not taught (different from col. 2 ll. 52-55)
1a2	where the housing pivotably rotates about a pivot member	col. 6 ll. 22-26	col. 9 ll. 20-25 col. 10 ll. 36-48 col. 11 ll. 37-48	Not taught
1a3	between an opened and closed position	Not taught	Not taught	Not taught
1a4	wherein the pivot member has a lateral axis	col. 6 ll. 22-26 Fig. 1	col. 9 ll. 20-25	Not taught
1b	positioning hot rolled coils of steel in the furnace such that the axis of the coil is generally horizontal to the base portion	Not taught	Not taught	Not taught
1c	pivoting housing about the hot rolled coils to close the furnace	Not taught	Not taught	Not taught
1d	establishing a reducing atmosphere with the furnace	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
1e	annealing the hot rolled coils of steel in the furnace	Not taught	Not taught	col. 2 ll.52-67
1f	pivoting housing about the hot rolled coils to open the furnace	Not taught	Not taught	Not taught
2	coil placed on its circumferential surface	Not taught	Not taught	Not taught
3	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
4	reducing atmosphere comprises nitrogen	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64

	ELEMENTS:	4,527,409	4,463,585	3,855,019
5	reducing atmosphere comprises propylene	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
6	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
7a	annealing cycle time less than 75 hours	Not taught	Not taught	col. 2 ll. 29-30 col. 3 ll. 58-64 col. 4 ln. 20
7b	annealing temperature between 1200 - 1650 degree F	Not taught	Not taught	col. 1 ll. 23, 33, 37, 52-53, 64, 66 col. 2 ll. 3, 29-30, 35-36, 57, 63 col. 3 ll. 59-64 col. 4 ln. 20
8Pre	A furnace for annealing hot rolled steel coil	Not taught	Not taught	Not taught
8a1	a furnace housing comprising a plurality of side walls, a base portion, a roof portion and	Not taught	Not taught	Not taught
8a2	a pivot member with an axis generally parallel with the base portion	col. 6 ll. 22-26 Fig. 1	col. 9 ll. 20-25	Not taught
8a3	where the housing pivotably rotates about the pivot member	col. 6 ll. 22-26	col. 9 ll. 20-25 col. 10 ll. 36-48 col. 11 ll. 37-48	Not taught
8a4	between an opened and a closed position	Not taught	Not taught	Not taught

	ELEMENTS:	4,527,409	4,463,585	3,855,019
8b1	a retaining element within the furnace housing where the retaining element holds each coil	Not taught	Not taught	Not taught
8b2	such that the axis of each coil is generally horizontal to the base portion	Not taught	Not taught	Not taught
8c	a sealing device capable of sealing the furnace housing when in the closed position	Not taught	Not taught	Not taught
8d	a system capable of establishing a reducing atmosphere within the furnace when sealed	Not taught	Not taught	col. 3 ll. 2-6
8e	a plurality of heating elements located within the furnace housing capable of heating hot rolled steel coil during the annealing process	Not taught	col. 12 ll. 34-35	Not taught (different from col. 2 ll. 52-55)
9	coil placed on its circumferential surface	Not taught	Not taught	Not taught
10a	annealing cycle time less than 75 hours	Not taught	Not taught	col. 2 ll. 29-30 col. 3 ll. 58-64 col. 4 ln. 20
10b	annealing temperature between 1200 - 1650 degree F	Not taught	Not taught	col. 1 ll. 23, 33, 37, 52-53, 64, 66 col. 2 ll. 3, 29-30, 35-36, 57, 63 col. 3 ll. 59-64 col. 4 ln. 20

	ELEMENTS:	4,527,409	4,463,585	3,855,019
11	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
12	reducing atmosphere comprises nitrogen	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
13	reducing atmosphere comprises propylene	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
14	reducing atmosphere comprises hydrogen	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
15	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	Not taught	Not taught	col. 3 ll. 2-6 col. 3 ll. 59-64
16a	annealing cycle time range 40 - 60 hours	Not taught	Not taught	col. 2 ll. 29-30 col. 3 ll. 58-64 col. 4 ln. 20
16b	annealing temperature between 1200 - 1600 degree F	Not taught	Not taught	col. 1 ll. 23, 33, 37, 52-53, 64, 66 col. 2 ll. 3, 29-30, 35-36, 57, 63 col. 3 ll. 59-64 col. 4 ln. 20
17	annealing is a batch process	Not taught	Not taught	col. 1 ll. 51-53

	ELEMENTS:	3,636,579	2,113,537	EP 0,468,716
1Pre	A method of annealing hot rolled steel coil	col. 2 ll. 38-39	col. 1 ll. 42-43	Not taught
1a1	assembling a furnace housing comprising a plurality of side walls, a base portion and a roof portion	Not taught	Not taught	col. 7 ll. 27-41 col.8 ln.52-col.9 ln. 11
1a2	where the housing pivotably rotates about a pivot member	Not taught	Not taught	Not taught
1a3	between an opened and closed position	Not taught	Not taught	Not taught
1a4	wherein the pivot member has a lateral axis	Not taught	Not taught	Not taught
1b	positioning hot rolled coils of steel in the furnace such that the axis of the coil is generally horizontal to the base portion	Not taught	Not taught	Not taught
1c	pivoting housing about the hot rolled coils to close the furnace	Not taught	Not taught	Not taught
1d	establishing a reducing atmosphere with the furnace	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	col. 7 ll. 13-26 col. 8 ll. 26-29
1e	annealing the hot rolled coils of steel in the furnace	col. 2 ll. 38-39 col. 4 ll. 29-31 col. 10 ln. 28	col. 3 ll. 30-31 col. 1 ll. 42-43	Not taught
1f	pivoting housing about the hot rolled coils to open the furnace	Not taught	Not taught	Not taught
2	coil placed on its circumferential surface	Not taught	Not taught	Not taught
3	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught
4	reducing atmosphere comprises nitrogen	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught

	ELEMENTS:	3,636,579	2,113,537	EP 0,468,716
5	reducing atmosphere comprises propylene	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught
6	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught
7a	annealing cycle time less than 75 hours	col. 2 ll. 11-12 col. 4 ll. 25-31 col. 4 ll. 62-64 col. 5 ll. 3-4 col. 5 ln. 18 col. 6 ll. 6-17 col. 8 ll. 14, 37, 62 col. 9 ll. 8, 33 col. 10 ln. 5	col. 1 ll. 34-35 col. 1 ln. 53-col. 2 ln.5	Not taught
7b	annealing temperature between 1200 - 1650 degree F	col. 2 ll. 11-20 col. 2 ll. 39-46 col. 4 ll. 25-31 col. 4 ll. 62-64 col. 4 ll. 71-73 col. 5 ll. 20-37 col. 5 ln.74-col. 6 ln. 5 col. 6 ll. 22-28, 36-37 col. 6 ll. 57-62 col. 7 ll. 65-66 col. 8 ll. 14, 37, 62 col. 9 ll. 8, 33 col. 10 ln. 5	col. 1 ll. 33-35 col. 1 ll. 43-48	Not taught
8Pre	A furnace for annealing hot rolled steel coil	Not taught	Not taught	Not taught
8a1	a furnace housing comprising a plurality of side walls, a base portion, a roof portion and	Not taught	Not taught	col. 7 ll. 27-41 col.8 ln.52-col.9 ln.11
8a2	a pivot member with an axis generally parallel with the base portion	Not taught	Not taught	Not taught
8a3	where the housing pivotably rotates about the pivot member	Not taught	Not taught	Not taught
8a4	between an opened and a closed position	Not taught	Not taught	Not taught

	ELEMENTS:	3,636,579	2,113,537	EP 0,468,716
8b1	a retaining element within the furnace housing where the retaining element holds each coil	Not taught	Not taught	Not taught
8b2	such that the axis of each coil is generally horizontal to the base portion	Not taught	Not taught	Not taught
8c	a sealing device capable of sealing the furnace housing when in the closed position	Not taught	Not taught	col. 7 ll. 13-26 col. 8 ll. 26-29
8d	a system capable of establishing a reducing atmosphere within the furnace when sealed	col. 3 ll. 23-24 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	col. 7 ll. 13-26 col. 8 ll. 26-29
8e	a plurality of heating elements located within the furnace housing capable of heating hot rolled steel coil during the annealing process	Not taught	Not taught	Not taught
9	coil placed on its circumferential surface	Not taught	Not taught	Not taught
10a	annealing cycle time less than 75 hours	col. 2 ll. 11-12 col. 4 ll. 25-31 col. 4 ll. 62-64 col. 5 ll. 3-4 col. 5 ln. 18 col. 6 ll. 6-17 col. 8 ll. 14, 37, 62 col. 9 ll. 8, 33 col. 10 ln. 5	col. 1 ll. 34-35 col. 1 ln. 53-col. 2 ln.5	Not taught
10b	annealing temperature between 1200 - 1650 degree F	col. 2 ll. 11-20 col. 2 ll. 39-46 col. 4 ll. 25-31 col. 4 ll. 62-64 col. 4 ll. 71-73 col. 5 ll. 20-37 col. 5 ln.74-col. 6 ln. 5 col. 6 ll. 22-28, 36-37 col. 6 ll. 57-62 col. 7 ll. 65-66 col. 8 ll. 14, 37, 62 col. 9 ll. 8, 33 col. 10 ln. 5	col. 1 ll. 33-35 col. 1 ll. 43-48	Not taught

	ELEMENTS:	3,636,579	2,113,537	EP 0,468,716
11	reducing atmosphere comprises at least one inert gas and at least one polyolefin gas	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught
12	reducing atmosphere comprises nitrogen	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught
13	reducing atmosphere comprises propylene	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught
14	reducing atmosphere comprises hydrogen	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught
15	reducing atmosphere comprises nitrogen in an amount greater than 90%, hydrogen in a range of 5 - 7% and prolylene less than 1%	col. 3 ll. 23-24 col. 4 ln. 25 col. 6 ln.70-col. 7 ln.8	col. 1 ll. 44-46 col. 3 ll. 32-33	Not taught
16a	annealing cycle time range 40 - 60 hours	col. 2 ll. 11-12 col. 4 ll. 25-31 col. 4 ll. 62-64 col. 5 ll. 3-4 col. 5 ln. 18 col. 6 ll. 6-17 col. 8 ll. 14, 37, 62 col. 9 ll. 8, 33 col. 10 ln. 5	col. 1 ll. 34-35 col. 1 ln. 53-col. 2 ln.5	Not taught
16b	annealing temperature between 1200 - 1600 degree F	col. 2 ll. 11-20 col. 2 ll. 39-46 col. 4 ll. 25-31 col. 4 ll. 62-64 col. 4 ll. 71-73 col. 5 ll. 20-37 col. 5 ln.74-col. 6 ln. 5 col. 6 ll. 22-28, 36-37 col. 6 ll. 57-62 col. 7 ll. 65-66 col. 8 ll. 14, 37, 62 col. 9 ll. 8, 33 col. 10 ln. 5	col. 1 ll. 33-35 col. 1 ll. 43-48	Not taught
17	annealing is a batch process	Not taught	Not taught	Not taught

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(54) Title of the Invention Coil annealing method

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Specification

1. Title of the Invention

Coil annealing method

2. Claims

A coil annealing method characterized in that, together with being made so that multiple hot coils mutually prevent each adjacent coil from rapidly cooling by being placed horizontally so that the centerline of the hole of each coil is within the same vertical plane, and the end faces of each coil are mutually adjacent, annealing of the coils is carried out by means of self-possessed heat that the coils themselves have due to the fact that the periphery of multiple coils, including one part of a coil carrier machine, is covered by a thermal insulation cover.

3. Detailed Explanation of the Invention

(Industrial Field of Application)

The present invention relates to a coil annealing method, and more particularly to a self-annealing method of a hot coil in a hot strip steel rolling line. The method of the present invention can be advantageously applied to general coil carrying equipment and the like other than the above-mentioned.

(Prior Art)

Formerly, in a hot strip steel rolling line, among hot coils (a coil hot rolled and left unchanged is referred to in this way without regard to the temperature of the coil) rolled up in a coil shape, those for which, in terms of the material thereof, the hardness is too hard for cold rolling as it is and cold rolling is impossible, or, even if cold rolling were possible as it is, after cold rolling, the material characteristics regarded as necessary (toughness, deep drawing characteristics and the like) are not obtained, generally, were annealed by means of a coil annealing furnace prior to cold rolling. Because an annealed hot coil, formerly, was charged to the coil annealing furnace by way of the coil carrying line from the hot rolling line, the coil stack yard, and the coil acid cleaning yard, the lowering of the temperature of the coil itself was great, consequently, in the coil annealing furnace, the annealing of the coil was carried out consuming a large amount of fuel.

For the purpose of eliminating this weak point, the so-called self-annealing method that anneals a coil by means of the self-possessed heat a coil itself has by means of rolling up a coil in a high temperature state in the hot strip steel rolling line is already well-known (patent number 246065, patent number 493331, and the like).

(Problems that the Invention is to Solve)